

CLAIMS

What Is Claimed Is:

1. A towline conveyor comprising:
a generally fixed track;
5 a wearing surface in the track comprising a polymer-based composite; and
a chain positioned to run in the track along the wearing surface.
2. The towline conveyor of Claim 1, wherein the composite wearing surface
is formed from a plurality of wearing sections separably mountable in the track.
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3. The towline conveyor of Claim 2, wherein said wearing sections have
uniform composition.
4. The towline conveyor of Claim 2, wherein each of the plurality of wearing
15 sections comprises a first section in contact with said chain and a second section
supporting said first section.
5. The towline conveyor of Claim 4, wherein said first section has a greater
wear resistance than said second section.
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6. The towline conveyor of Claim 2, wherein the plurality of wearing
sections comprise a plurality of generally flat surfaces contacting the chain.
7. The towline conveyor of Claim 6, wherein the track comprises a corner
25 section defining an inner radius and the generally flat surfaces contacting the chain in the
corner section define bottom and side wear surfaces.

8. The towline conveyor of Claim 7, wherein the bottom and side wear surfaces in the corner section are formed from a plurality of wearing inserts, each wearing insert comprising one of the bottom wear surfaces and one of the side wear surface.

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9. A towline conveyor comprising:
a mounting structure;
a plurality of polymer-based bottom wearing sections replaceably mounted in the mounting structure; and
10 a chain running along the wearing sections.

10. The towline conveyor of Claim 9, wherein the mounting structure is steel.

11. The towline conveyor of Claim 9, wherein the mounting structure is
15 mounted in a floor, and the bottom wearing sections are replaceable without breaking the floor or the mounting structure.

12. The towline conveyor of Claim 9, a plurality of polymer-based side bearing sections replaceably mounted to the mounting structure.

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13. The towline conveyor of Claim 12, wherein the mounting structure is mounted in a floor and the top of the side wearing sections are level with the floor when the side wearing sections are mounted to the mounting structure.

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14. The towline conveyor of Claim 12, wherein the side bearing sections are mounted on opposite sides of the chain in one or more straight sections of the conveyor.

15. The towline conveyor of Claim 9, comprising a plurality of wearing inserts defining the bottom wearing sections and defining corresponding side wearing sections, wherein the chain runs along the side bearing sections.

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16. The towline conveyor of Claim 15, comprising a plurality of carrier blocks mounted to the mounting structure, wherein the bearing inserts are replaceably mounted to the carrier blocks.

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17. The towline conveyor of Claim 16, wherein the carrier blocks and bearing inserts comprise mateable channels for replaceably mounting the bearing inserts to the carrier blocks.

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18. A replaceable wearing surface for a towline conveyor comprising a mounting structure and a chain running relative to the mounting structure, wherein the replaceable wearing structure comprises:

a polymer-based wearing surface; and

structure adapted to removably connect the replaceable wearing surface to the mounting structure such that the chain runs along the polymer-based wearing surface.

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19. The replaceable wearing of Claim 18, wherein the mounting structure comprises a carrier block comprising channels for mating with the replaceable wearing surface and wherein the replaceable wearing surface comprises channels for mating with the carrier block.

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20. The replaceable wearing surface of Claim 19, wherein the mounting structure is mounted in a floor, and wherein top of the replaceable wearing surface is level with the floor when the replaceable wearing surface is mounted in the mounting structure.

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21. A towline conveyor track comprising:
mounting structure, and
a plurality of wearing surfaces, wherein the wearing surfaces are substantially stationary relative to the mounting structure when said towline conveyor in operation.

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22. The towline conveyor track of Claim 21, wherein said wearing surfaces are replaceable.

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23. A self-lubricating non-metallic composition comprising a mixture of

(a) at least one thermoplastic or thermoset polymer as a matrix;

(b) as additives

(1) titanium carbide particles

(2) F-UHMWPE

(3) polyaramide fibers and, optionally

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(4) molybdenum disulfide,

(5) fluorinated polyether oil, or

(6) powdered polytetrafluoroethylene (PTFE)

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24. A self-lubricating non-metallic composition of Claim 23 wherein said matrix is a thermoplastic polymer.

25. A self-lubricating non-metallic composition of Claim 24 wherein said thermoplastic polymer matrix comprises at least one member of the group consisting of polyaramides, polyformaldehydes, polyolefins, polyesters, polyvinylidene fluorides, and benzoyl substituted poly (1,4-phenylene)

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26. A self-lubricating non-metallic composition of Claim 23 wherein said matrix is a thermoset polymer.

27. A self-lubricating non-metallic composition of Claim 26 wherein said
10 thermoset polymer matrix comprises at least one member of the group consisting of polyurethanes, epoxies, reactive polyester styrenes, and vinyl esters.

28. A self-lubricating non-metallic composition of Claim 23 wherein said additives of (b) include molybdenum disulfide.

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29. A self-lubricating non-metallic composition of Claim 23 wherein said additives of (b) include a fluorinated polyether oil.

30. A self-lubricating non-metallic composition of Claim 23 wherein said
20 additives of (b) include powdered PTFE.

31. A self-lubricating non-metallic composition of claim 30 wherein the additives of (b) include each of additives (b)(1)-(b)(6).

25 32. A self-lubricating non-metallic composition comprising a cured mixture of

(a) at least one matrix polymer selected from the group consisting of amine-cured polyether urethane prepolymers, epoxies, and vinyl esters.

(b) as additives,

- (1) molybdenum disulfide,
- (2) titanium carbide particles,
- (3) F-UHMWPE,
- (4) fluorinated polyether oil,
- (5) powdered PTFE,
- (6) fluorinated polyaramide fibers.

33. A self-lubricating non-metallic composition of Claim 32 comprising a matrix polymer 14 to 35 wt % of (b)(1), 5 to 9 wt % of (b)(2), 0.5 to 5.5 wt % of (b)(3), 7 to 11 wt % of (b)(4), 0 to 15 wt % of (b)(5), and 1 to 5 wt % of (b)(6).

34. A self-lubricating non-metallic composition of Claim 32 wherein said matrix polymer is a polyether urethane prepolymer cured with MBCOA.

35. A self-lubricating non-metallic composition comprising a cured mixture of

- (a) as a matrix an amine-cured polyether urethane prepolymer;
- (b) as additives;

- (1) molybdenum disulfide,
- (2) titanium carbide particles,
- (3) F-UHMWPE,
- (4) fluorinated polyether oil,

- (5) powdered PTFE,
- (6) fluorinated polyaramide fibers.

36. A self-lubricating non-metallic composition of Claim 35 containing 44.7
5 wt% polyether urethane prepolymer, 17.5 wt% amine curing agents, 11.2 wt%
molybdenum disulfide, 14.3 wt% titanium carbide , 8.9 wt% F-UHMWPE, 0.67 wt%
fluorinated polyether oil, 2.2 wt% powdered PTFE, and 0.45 wt% fluorinated
polyaramide fibers.